

THE AUSTRALIAN PLANT DISEASE RECORDER.

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PLANT DISEASE NOTES.

CEREALS AND GRASSES:

BASAL GLUME ROT OF WHEAT:

Heads of "Sword" wheat affected by this disease were collected at Roseworthy, S.A., in November. The symptoms agreed with those given in various accounts in the literature, including that by Noble (Agr. Gazette N.S.W. 44 : 107). A bacterium agreeing in its description with that for B.atrofaciens McCulloch was isolated but as yet there has been no opportunity to test its pathogenicity for wheat. This basal glume rot, of which there appears to be no previous local record, was seen in three different crops of "Sword" a variety which has been popular in the district for several years. It was not observed in "Gabo" growing next to, and in the same paddock, as one of the affected crops. Its absence here was perhaps associated with the fact that the seed of "Gabo" was obtained from another district whereas the Sword was "home grown".

In affected crops, which were almost mature, 20 - 30% of the heads revealed some evidence of infection, but only on a very small proportion of these were there odd spikelets so severely infected that they contained shrivelled grain. No appreciable reduction in yield was therefore anticipated.

The growers whose crops were seen considered that the same disease was also present last year when the latter part of Spring was also unusually wet. In 1948, one crop of Sword, which had grown exceptionally well, was considered to have suffered quite considerably in yield. Excepting for one crop of "Nawab", infection in 1948 had also, it seems, been confined to "Sword".

- D. B. ADAM.

DISEASES OF WHEAT IN N.S.W. - 1949/50:

No diseases of wheat assumed epiphytotic proportions on a State-wide basis during 1949/50. Within certain districts moderate to heavy infection with stem rust, take-all, foot-rot, Septoria and black point occurred, and some substantial losses resulted. Throughout the State as a whole, however, frost injury had a more serious effect on crop yields than any disease of parasitic origin.

In the late Spring and early Summer stem rust appeared likely to develop to a serious extent. However, a prolonged period of unseasonably cool weather in October and November suppressed its

widespread development and only an occasional crop showing heavy infection was observed. A noteworthy feature of stem rust occurrence during the season was the advent of strains capable of attacking hitherto resistant varieties in Yalta, Kendee, Charter and Gabo. Of these varieties, Yalta appeared to be most susceptible. Celebration and Warigo maintained their resistance. Observations at Glen Innes indicated that certain of the "48" or "B.C." lines supposedly carrying Gabo stem rust resistance are even more susceptible in the field to the new strains than Gabo itself.

Leaf spot (Septoria tritici) is usually confined to the southern and central western portions of the N.S.W. wheat belt. This season, however, in addition to occurring in these areas, it developed extensively in the north and north-west. Glume blotch (Septoria nodorum) was more prevalent than usual in all wheat-growing areas.

Downy mildew, rarely observed in this State, developed to a minor extent in the Riverina. As high as 10% infection was noted in low-lying, poorly-drained areas in a crop of Gabo at Berrigan.

Black point (Helminthosporium and Alternaria spp. associated) was very pronounced in many northern grain samples.

Take-all incidence was higher than usual in southern and central western districts. It developed late in the season following abnormally wet conditions in October. Correlation between wet Springs and "take-all" years has been observed previously by Garrett (Jour. Agr. Sth. Aust. 37: 976-983, 1934). The increase in take-all is also believed to be associated with the continuous cropping programmes which have accompanied high wheat prices in the post-war period.

Frost injury was prevalent in all sections of the wheat belt. Basal stem frosting was particularly serious and led to much premature ripening and pinching of grain. Foot rot (Helminthosporium sativum and Fusarium culmorum, alone or in association) frequently developed in frost-damaged crops.

False black chaff (melanism) developed extensively on Warigo throughout the State but particularly in the north and north-west following dull, cloudy and moist weather in October. All Hope hybrids in experimental plots at Tamworth showed the condition. Other hybrids were not affected.

FIELD AND FODDER CROPS:SEPTORIA SP. ON LODGED FLAX STRAW:

A common fungus found on lodged flax straw in Victoria is Septoria sp. This fungus is different to Septoria linicola (Sphaerella linorum) the causal organism of Pasmo disease.

The pycnidia of Septoria sp. are larger, darker and more superficial than those of S. linicola. In addition, there is usually no clear-cut line of demarcation between healthy and affected tissue, such as is characteristic of Pasmo disease.

- C. R. MILLIKAN.

VEGETABLES:SUSCEPTIBILITY OF SEBAGO POTATO TO BLACKLEG:

During the wet Spring - in which floods occurred - a relatively severe outbreak of blackleg (Erwinia carotovora) occurred in crops of Sebago grown from certified seed in the Clarence River district of N.S.W. Neighbouring crops of Katahdin and Factor showed minor infection only. Sebago crops of similar seed origin grown in other districts in N.S.W. were free of blackleg. This, together with earlier reports of blackleg in Sebago, suggests an unusual susceptibility of this variety to the disease. It is noted that the Canadian Plant Survey Report for 1948 also refers to Sebago as a susceptible variety.

- C. J. MAGEE.

FRUIT:BLACK HEART OF APRICOTS IN VICTORIA:

Black heart, associated with Verticillium dahliae has become a problem in certain apricot growing areas of Victoria. In every instance the diseased trees have been growing on land which had a previous history of tomatoes, or had been interplanted with tomatoes during the first year or two of growth. Black heart has been experimentally produced by inoculating the roots of young apricot trees with V. dahliae.

The following information was received from the local office of the Department of the Interior, Bureau of Land Management, on the subject of the proposed project.

A review of the records of the Bureau of Land Management, Department of the Interior, for the year 1964, revealed that the proposed project was not included in the list of projects for that year.

However, a review of the records of the Bureau of Land Management, Department of the Interior, for the year 1965, revealed that the proposed project was included in the list of projects for that year.

The following information was received from the local office of the Department of the Interior, Bureau of Land Management, on the subject of the proposed project.

An examination of the records of the Bureau of Land Management, Department of the Interior, for the year 1966, revealed that the proposed project was not included in the list of projects for that year.

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The disease has been recorded for the first time during the present season in nursery stock in Victoria. Here again, it was found that the nursery area had been previously used for growing tomatoes and potatoes.

Apricots on apricot root-stocks are most readily affected with black heart, whereas apricots on certain types of plum root-stocks appear to be much less liable to the disease.

However, apricots on some types of plum stocks have been found to be severely affected with black heart, and work is now in progress with a view to assessing the resistance to black heart of apricots on various types of plum stocks.

- C. R. MILLIKAN.

PEACH STOCKS SEVERELY ATTACKED BY CLASTEROSPORIUM CARPOPHILUM:

An unusually severe attack of shot-hole (Clasterosporium carpophilum) was observed on budded peach stocks in a nursery at Orange, N.S.W., recently.

The attack was most severe in one corner of the planting which was close to an old neglected and heavily-infected almond tree in an adjoining paddock. In this heavily-infected zone, which extended some 20 feet from the almond tree, all buds (inserted last March) had failed to shoot, although the "take" of buds was quite good. The stocks were defoliated and the bark covered with sunken shot-hole lesions from which much gum exuded.

The next zone extended another 20 to 30 feet from the almond tree and here most of the inserted buds failed to shoot. Of the shoots which were produced many were blighted. The damage to the stocks was less severe in this zone, although leaf and bark infections were numerous.

Beyond these zones the stocks were more or less normal, though infection was sufficiently heavy to cause occasional buds to fail.

This observation tends to indicate that the large heavy spores of Clasterosporium carpophilum are strictly limited in their dispersal; wind-driven rain probably being the agent of dissemination.

- K. E. HUTTON.

SUDDEN DEATH OF CHERRY TREES:

Mr. D. T. Kilpatrick, Horticultural Adviser in the S.A. Department of Agriculture recently drew our attention to the sudden death of 50 "Williams' Favourite" cherry trees in which grafts of "Beauchamp's Black" had been inserted for purposes of pollination. These trees occurred in two separate blocks at Summertown in the Hills district behind Adelaide, and the occurrence was notable because in each case there was one healthy survivor; a tree in which the insertion of grafts of "Beauchamp's Black" had somehow been omitted.

This observation is comparable to one made several years ago when, on the same variety, "Williams' Favourite", grafts of "Napoleon" were inserted. On that occasion an attempt was made to reproduce the condition experimentally by grafting shoots of "Napoleon" on a single Williams' Favourite Tree at the Blackwood Experimental Orchard, but the tree has not been affected adversely. "Williams' Favourite" is a popular variety derived locally from a seedling raised by the late Mr. Driver.

- D. B. ADAM.

LEAF CURL OF STONE FRUITS:

During the Spring of 1949 there was an epiphytotic of leaf curl, Tachrina deformans, not only in the Metropolitan and other Coastal areas of N.S.W., but also it was reported from the Western districts and the Murray River, where it had not been seen on any scale for about ten years.

Spraying trials conducted at Bathurst Experiment Farm showed that for the control of leaf curl, Bordeaux mixture at 8-8-100- $\frac{1}{2}$ was equal in efficiency to the 15-15-100- $\frac{1}{2}$ mixture. The 5-5-100- $\frac{1}{2}$ strength gave fair control but 2-2-100- $\frac{1}{2}$ was of very little value. Emphasis should be maintained on the early application of the spray just before the buds begin to swell, and on the importance of as complete a spray coverage of the dormant tree as possible.

- J.R.G. MORSCHEL.

DIEBACK OF McINTOSH RED APPLE:

During September, 1949, a report was received from Oakdale concerning a young planting of McIntosh Red apple trees where the majority of them were dying. Investigations revealed the presence of a fungus, Phomopsis mali, which has been recorded in Europe and America but not previously in Australia.

The trees appeared to die from the stock upwards and cankers began to appear along the main limbs. Immediately below the bark of these limbs there was a greyish mycelial plate and from this the characteristic fungus was isolated each time. After keeping the specimen material for five weeks, the globose pycnidia with their typical alpha conidia (ovoid spores) and beta conidia (stylospores) appeared.

Inoculations were made on Delicious and Granny Smith apple trees by the H cut method. Four weeks later the fungus was re-isolated in all cases, except controls. Still the trees showed no obvious symptoms of pathogenic attack. Roberts, Cayley and Briton Jones generally agree that Phomopsis mali is a weak pathogen which becomes active only when the host is in a devitalised state. Hence pathogenicity tests on a tree in full growth could scarcely be expected to show symptoms to any great extent.

- J.R.G. MORSCHER.

SEPTORIA SPOT OF CITRUS:

Fruit spot caused by Septoria depressa is usually present and occasionally serious in M.I.A. and Upper Murray orchards. It has never been recorded on the N.S.W. coast. It is serious only in seasons of more than normal Autumn rain and its appearance is associated with frosts. In the past a single Bordeaux-white oil spray in March or April has given almost complete control, but in 1949 such sprays were ineffective. A fortnight of almost continuous rain from the end of February enabled infection to take place before most growers applied the spray. This is proved by the development of spot on fruit which was bagged on 14th March for infection experiments and which remained covered till early August. Infection, therefore, occurred while the fruit was still green and not full-sized, but remained latent until the end of July. The appearance of fruit spot followed a week of unusually heavy frosts in Mid-July. Cold temperatures are evidently essential to stimulate the further development of the latent infection, since

fruit inoculated and bagged in a Sydney suburban garden in April developed no spot, though latent infections were shown by cultural means to be present in the rind when the fruit was harvested in August.

- L.R. FRASER.

FLOOD DAMAGE TO CITRUS ORCHARDS IN THE HAWKESBURY RIVER AREA:

In June, 1949, following heavy rain, the Nepean and its tributaries - the Colo and the MacDonald - came down in flood and orchards along the river flats were submerged for periods of 3-6 days and, in the case of a few blocks in low areas, for longer. There was considerable immediate mechanical damage caused by debris and silt, and unpicked fruit developed brown rot or water spot. However, except in blocks which had been submerged for over 5 days, leaf drop was negligible and the trees appeared in reasonable condition.

Root rot, however, given an impetus by the flood, continued during the Spring, and by late November, with rising temperatures and evaporation rates, the effects became very apparent as yellowing, die-back and leaf loss. Trees in lower parts of blocks are dying out. Many blocks, especially in the heavier soils, are too badly affected for recovery to be possible. The older blocks and those which, before the flood, showed some indications of the presence of Phytophthora citrophthora, have suffered most. Young trees and those in sandy, well-drained parts look reasonably healthy. A number of blocks of trees on trifoliata root-stock in the area are in perfect condition, well demonstrating the usefulness of this stock in Phytophthora-liable soils.

- L.R. FRASER.

MISCELLANEOUS PLANTS:

DIEBACK OF P. RADIATA AT MURRAGULDRIE S.F. NEW SOUTH WALES:

In the October, 1949 issue of this Journal W.V. Ludbrook and C.E. Carter recorded some observations on dieback of P. ponderosa in plantations near Canberra. The same writers commented that they would be interested to hear of any other large scale occurrences of dieback of P. ponderosa in Australia. While

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we have no record in New South Wales State Forests of the condition described affecting P. ponderosa there is an outstanding example of what seems to be a very similar condition affecting P. radiata at Murraguldrrie State Forest (Wagga district). These trees were planted from 1930-35 on shaly and granitic ridges which slope toward swampy or excessively moist land, and until recently the stand was regarded as a good one. The symptoms of disease which have appeared are dieback, occurring usually at the apex of the tree and less frequently on laterals, and also copious resin flow usually from high up the tree. The dieback varies from a few inches of the leader to the whole tree and some of the compartments have been so severely affected that they have had to be clear felled. P. pinaster and P. laricio which are present to a minor extent in areas contiguous to the diseased radiata are unaffected as also is much of the older P. radiata. There does not seem to be any relationship between local soil conditions and the spread of the disease. Although some dieback has been noticed for a number of years at this plantation the major damage seems to have occurred following a severe hail storm in January, 1948. Evidence of the damage inflicted by the storm can still be seen. It was naturally suspected in view of previous evidence that Diplodia pinea was responsible for the disease. Although this is not yet completely discounted it is now considered that another fungus may be the major pathogen. Pycnidia have not been found on affected trees or in forest litter so far examined. However, since Diplodia is so widespread in Pinus forests this fact is not considered otherwise than fortuitous. It has been observed that a fungus can regularly be recovered from any of the bleeding wounds and that discoloured wedges of wood can be seen to extend frequently into the pith, which is then discoloured too. The same fungus has been recovered from the discoloured wood and also the pith. Microscopic sections have shown its ramifications within the wood and the pith.

There is no difficulty in culturing the fungus but so far only vegetative spores have been obtained. The fungus seems to resemble closely one of the Dematiaceae but further cultural work is being done to clarify this point. Meanwhile young radiata plants in pots have been inoculated with the abovementioned fungus through artificially inflicted wounds. It is still too early to know the outcome of this operation but evidence of dieback and resin flow from the wounds has been obtained in some cases. It is to be observed that the damage at Murraguldrrie S.F. has been variously attributed to poor site quality, seasonal variations and storm damage. A degree of recovery has been noticed from time to time in individual trees. Our view, which is strictly an opinion at present is that the disease is due to a wound saprophyte which can apparently take on the function to some extent of a parasite. Hail lesions, insect punctures or pruning cuts could open the way for the fungus. Sections taken through old logs show clearly that

wound furrows have occurred frequently in the past. Sometimes several seasons have elapsed before these wounds have healed as indicated by the annual rings.

Where large wounds have occurred and have been buried in the wood, hardened resin is sometimes found and also a wedge of discolouration proceeding along the medullary rays towards the pith. The probability of an environmental factor influencing pinus growth has been mentioned by Ludbrook and Carter and there is, in our experience, certainly some ground for investigation along these lines in this country. Trenches which have been dug on Murraguldrie indicate the paucity of any organic accumulation in the upper soil horizons.

- D. T. HARTIGAN.

R. M. AIRD.

DIE-BACK OF PINES:

Pinus ponderosa (A.P.D.R. 1: 4, 58-59: 1949) is not grown to any extent in the N.S.W. Central Coast and its reaction to Diplodia pinea is not known. However, observations over the past two years have strengthened the opinion that this fungus may be responsible for the relatively short life of P. radiata here. Pinus radiata has been extensively planted in the Hills and Windsor districts as windbreaks for citrus orchards.

The Spring and early Summer of 1947 were more than usually cool and wet. By mid-Summer pines in young and old breaks showed extensive twig and limb die-back and many died out. Diplodia pinea was associated with the die-back, but at that time was thought to be secondary, and the possibility of a root-rotting organism was entertained. It is known that Phytophthora cinnamomi does cause root and collar rot of seedling P. radiata.

With the onset of drier conditions in early 1948 many affected pines made new shoot growth, but further injury was noted following the unusually moist conditions of the first half of 1949. At present windbreak trees in the County of Cumberland show all stages of deterioration. This is not restricted to trees of any one age group, since those of 12 to 15 years or over 50 years are in much the same condition; some have died out, others show varying degrees of leaflessness and others appear completely healthy. Nor is the deterioration related to any particular soil type and observations have not confirmed the possible association of root

rot since trees in well-drained or even dry soil and those in well-watered soils show the same variability.

The existence of completely healthy trees often of great age among dead and dying trees would appear to indicate considerable variation in resistance to the factors concerned with senescence. It is suggested that D. pinea may be the chief factor. It is usually regarded as saprophytic or, at most, weakly parasitic, but it can cause blighting of vigorous seedlings and twig die-back of healthy and rapidly growing young trees. An instance of this was seen at Pitt Town where several hundred exceptionally vigorous 2-year-old windbreak trees growing under most favourable conditions were examined for D. pinea. About 20% of them showed more or less twig die-back and leaf blight. At this stage the growth of the trees is not affected at all, but it is suggested that the cumulative effect on susceptible individuals over many years might be to weaken them and shorten their life in proportion to their susceptibility.

— L.R. FRASER.

MISCELLANEOUS AND GENERAL NOTES:

USE OF EXCISED LEAVES FOR PATHOGENICITY TESTING OF FUNGAL ISOLATES.

The use of excised tomato leaves for the testing of pathogenicity of Alternaria solani isolates has been successfully employed by using the following technique.

Leaves are selected late in the afternoon to assure a high starch accumulation, petioles are recut under water about half an inch above the original cut to eliminate any air bubbles. The leaves are placed in 6 in. x 1 in. test tubes with the cut petiole immersed in Hoagland and Arnon mineral nutrient solution No. 1 (Hoagland, D.R. and Arnon, D.I. Calif. A.E.S. Circular 347, 1938.) Cultures under test can either be sprayed onto the leaf or a piece of agar and fungal mycelium placed on the leaf surface. The top of the test tube is closed with a loosely rolled cotton wool plug.

The use of a mineral nutrient solution is much superior to either water or sugar solutions. Control leaves will remain green and healthy for from five to six weeks in the nutrient solution whereas leaves in five per cent. sucrose solution become chlorotic and collapse within 14-16 days and in water in an even shorter time.

No trouble was experienced from rotting during the two to three weeks necessary for pathogenicity testing even though no efforts were made to establish sterile conditions.

- R. D. BROCK.

LONGEVITY OF *Alternaria Solani* ON CULTURE MEDIA:

Pathogenic isolates of *Alternaria solani* made from potatoes and tomatoes during March and April 1947 were transferred to Potato Dextrose Agar slopes in May 1947. These slopes were stored at room temperature until September 1949. By this time the media was dried and hard. Examination revealed spores of the organism. Transfers from these slopes grew quite readily on fresh PDA slopes and were found to retain their original level of pathogenicity when inoculated to tomato plants.

- R. D. BROCK.

USTILAGO UTRICULOSA ON *POLYGONUM* SP.:

Reference was made in A.P.D.R. 1: 4: 59: 1949 to *Ustilago utriculosa* on an unidentified species of *Polygonum*. The host has now been identified by Mr. Johnson of the National Herbarium, Botanic Gardens, Sydney, as *Polygonum minus*.

- D. SHAW.

COMMONWEALTH MYCOLOGICAL INSTITUTE NOTES.

PROPOSALS FOR NEW SERVICES:

Proposals, arising from the 4th Mycological Conference of 1948, for the issue by C.M.I. of a Broadsheet of items of Mycological and Phytopathological interest, the production of loose-leaf sheets describing plant pathogenic fungi, and the preparation of checked exsiccati for distribution have been discussed by the Executive Council of C.A.B. Examination has shown that each of these new services would entail considerable expenditure on staff and materials, of a recurring nature, and as this outlay cannot be met from existing contributions it would have to be referred to contributing governments. The proposals have been placed on the Agenda of the C.A.B. Review Conference which is set down for June, 1950.

EXTENSION OF PREMISES:

Some progress has been made in negotiations for the acquisition of land for carrying out extensions to the C.M.I. Arrangements have been made for £11,000 loan money to be made available from the reserve funds within the C.A.B. organisation to purchase land and buildings on the opposite side of Ferry Lane. The financial arrangements are temporary and subject to endorsement by the 1950 Review Conference and liquidation of the loan.

NEW TECHNICAL COMMUNICATIONS IN PREPARATION:

1. Citrus rootstocks.
2. Shelterbelts and windbreaks.
3. Climatology in relation to crop production and behaviour.
4. Use of back-crossing in plant breeding.
5. Laterite and lateritic soils.

ASSISTANT SECRETARY - C.A.B.:

Applications are invited for the post of Assistant Secretary to the Executive Council of C.A.B. Salary not less than £stg. 700+ 25 - 900. The work is mainly administrative and experience with finance and staff matters is essential. Full particulars of qualifications and experience should be addressed to the Secretary, C.A.B., 2 Queen Anne's Gate Buildings, Dartmouth St., London, S.W.1.

- C.J. MAGEE.

These figures are based on the results of the 1907 census of the United States, and are not intended to represent the results of the 1910 census. The figures for 1907 are given in the following table, and the figures for 1910 are given in the following table.

TABLE 1. - THE RESULTS OF THE 1907 CENSUS OF THE UNITED STATES.

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TABLE 2. - THE RESULTS OF THE 1910 CENSUS OF THE UNITED STATES.

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